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IoT Interface



3124300

Tasks and Virtual Devices

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1 Tasks

1.1 General

The tasks can be used to query the status of all connected components and logically link them with each other. Date values can also be included in the links. Different actions can be initiated for a status change of the Trigger Expression (see section 1.3 "Specifying the trigger expression"). For example, an appropriate e-mail can be sent in the event of an alarm message from a connected access sensor on a certain day of the week. The current status of a task cannot be queried via SNMP. This is possible only for a virtual device (see section 2 "Virtual Devices").

1.2 Tasks tab

The following information for as many as 16 different tasks is displayed on this tab:

Parameter	Explanation
ID	Unique ID of the task. This ID is defined by the system and cannot be changed.
Name	Designation of the task.
Description	(Detailed) Description of the task.
Enabled	Display "Yes" or "No" as to whether the appropriate task is activated, i.e. the associated action is performed (or not).

Tab. 1: Tasks tab

The settings of the individual tasks can be changed after clicking the **Edit** button in the "Task Configuration" dialogue.

1.3 Specifying the trigger expression

- Click the **Edit** button of the task whose configuration is to be changed or created.

The "Task Configuration" dialogue appears.

Fig. 1: "Task Configuration" dialogue

1.3.1 Details group frame

Make the following settings in the left-hand **Details** group frame:

Fig. 2: **Details** group frame

Parameter	Explanation
Enable	Activate or deactivate the task.
Name	Designation of the task.
Description	(Detailed) Description of the task.
Delay	Delay time of a task in seconds. If the value "0" is entered here, no delay occurs irrespective of the selected "Delay Mode".
Delay Mode	Type of the delay
Dropdown list	Select an action to be performed when the associated expression is "true" or "false". Alternatively, a parameter value can also be selected.
Setup	Definition of the action to be performed.

Tab. 2: **Details** group frame

1.3.2 Delaying a task

A task can also be controlled with a delay time. This delay time is specified with the "Delay [s]" parameter and can be selected as required in the range 0 to 9999 seconds.

The delay time is configured using the dropdown list of the "Delay Mode" parameter:

Parameter	Explanation
Switch On Delay	Switch-on delay. If the associated expression evaluates "true", the system first waits the defined "delay" time before the set action is performed.
Switch Off Delay	Switch-off delay. If the associated expression evaluates "true", the set action is performed immediately. If a status changes and the expression evaluates "false" again, the system waits the defined "delay" time before the set action is undone.

Tab. 3: Selection list for the delay of a task

Parameter	Explanation
Pulse	Pulse. If the associated expression evaluates "true", the system performs the set action for the duration of the defined "delay" time. After expiration of this time, the action is stopped and reset to the associated origin.

Tab. 3: Selection list for the delay of a task

**Note:**

In general, the selected action is performed only when the "Trigger Expression" is always true after expiration of the delay time. If, however, a value changes during the delay time and the "Trigger Expression" is no longer true, the selected action is not performed.

1.3.3 Trigger Expression group frame

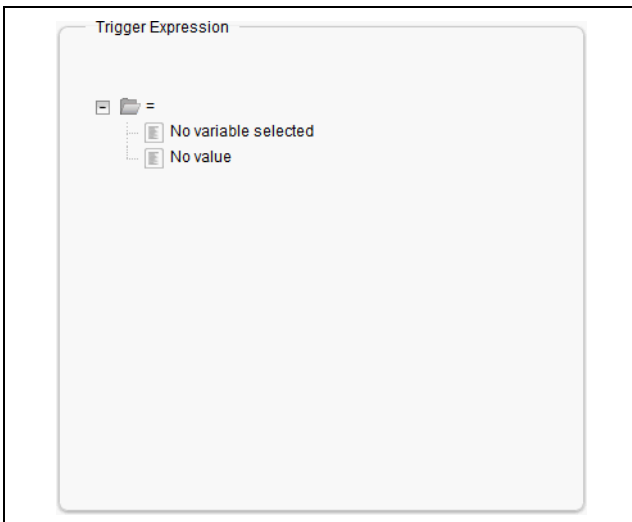


Fig. 3: Trigger Expression group frame

Specify in the right-hand **Trigger Expression** group frame the expression to be checked. For this purpose, various variables can be linked with each other using the Boolean operators "Or" ("|"), "And" ("&"), "Not Or" ("~|"), "Not And" ("~&"), "Equal to" ("=") and "Not equal to" ("<>").

Parameter	Explanation
Operator Type	Boolean operator with which the subordinate expressions should be linked or the variables checked.
Nature	Selection of the "Time" used to check a time value, or "Variable" to check a variable value.
Device	Selection of the device for which a value should be checked.

Tab. 4: Trigger Expression group frame

Parameter	Explanation
Variable	Variable whose value should be checked. This list displays only those variables made available for the previously selected device.
Value	Status for which the variable should be checked. This list displays only those statuses made available for the previously selected variable.

Tab. 4: Trigger Expression group frame

The dropdown lists for selection of the various setting options are displayed after clicking the default specified values "=", "No Variable Selected" or "No Value" (see section 1.5 "Example for creating a task").

The "=" and "<>" operators can be used to check variables of the IoT interface itself or the connected devices for a specific status. Alternatively, time details (weekday) can also be checked.

The two "|" and "&" operators are used to link subordinate expressions appropriately with each other.

Proceed as follows to create an expression:

- If several expressions should be checked: First specify whether both subordinate expressions must supply the value "true" (operator "&") or only one value suffices to initiate the action (operator "|").
- Specify separately for all subordinate expressions whether it supplies the value "true" when the variable or the time specification corresponds to the value (operator "=") or not (operator "<>").

**Note:**

The following descriptions include short video sequences. They are started by clicking the picture. If the video is not displayed correctly and completely when it is first played, restart it from the beginning with the control components.

Example: An action is performed when the measured internal temperature at the Blue e+ cooling unit or on the IoT interface assumes the "High Warning" status.

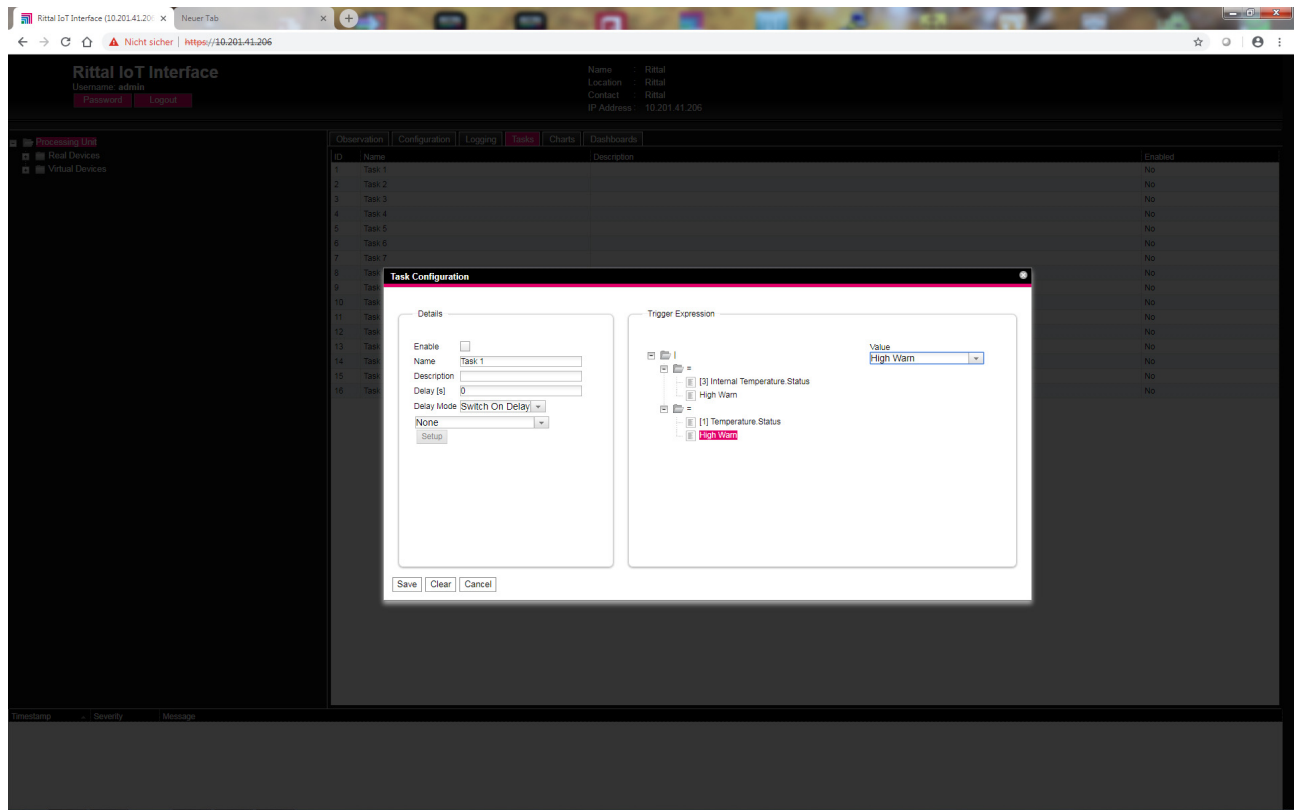



Fig. 4: "Trigger Expression" video

1.4 Selection of an action

Finally, assign to the task an action from the dropdown list when the complete expression switches to the value "true".



Note:

The action stored for a task is always performed only after a status change. If the definition of a task is changed, e.g. the logic of a switching output, the output is not switched directly when the change is accepted, but only when the status of an input changes.

Choose between the following settings:

Parameter	Explanation
Send Status Email	Send a status e-mail.
Suppress Alarm Email	Suppress the sending of the e-mail to the selected recipients.
Suppress Alarm Trap	Suppress the sending of the trap to the selected recipients.

Tab. 5: **Details** group frame

Parameter	Explanation
Suppress Alarm Message	Suppress the alarm message of the selected status variable.
Set Variable Value	Set a variable value.
Shutdown Server	Orderly shutdown of a server.

Tab. 5: **Details** group frame

After selection of the desired action, you must still configure it appropriately.

■ To do this, click the **Setup** button.

Depending on the previously selected action, enter in the appropriate dialogue to which, for example, a status e-mail will be sent ("Send Status Email" action), for which status an alarm message should be suppressed ("Suppress Alarm Message" action), etc.

1.4.1 "Set Variable Value" action

For selection of the "Set Variable Value" action, "switchable" variables (such as the digital outputs of a connected IO unit) can be set. Alternatively, you may opt for **no** action ("Do nothing": Select "--").



Note:
In the "Config Set Variable Value" dialogue, you must select in the "Device" dropdown list a device with a switchable variable so that the associated selection options are displayed in the fields below.

After clicking the **Setup** button, the "Configure Set Variable Value" dialogue appears.

Parameter	Explanation
Device	Device on which the variable should be set.
Variable	Variable that should be set.

Tab. 6: "Configure Set Variable Value" dialogue

Parameter	Explanation
Value on True	The value of the variable when the expression specified previously in the Trigger Expression group frame has the value "true".
Value on False	The value of the variable when the expression specified previously in the Trigger Expression group frame has the value "false".

Tab. 6: "Configure Set Variable Value" dialogue



Note:
Ensure that **different** values are selected in the two "Value on True" and "Value on False" dropdown lists. Otherwise, the variable retains this value even when the value of the expression in the **Trigger Expression** group frame changes.

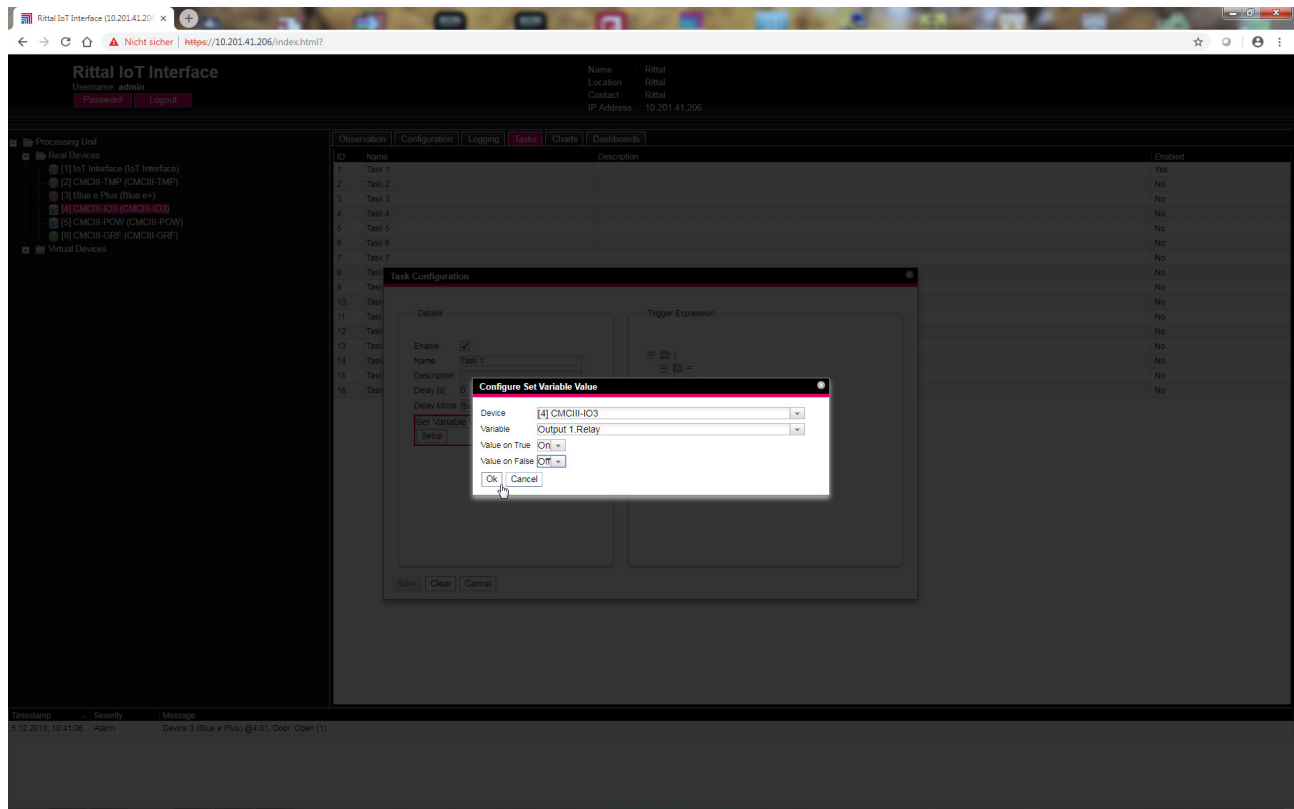


Fig. 5: "Set variable value" video

1.4.2 Grouping of outputs

The assignment of an output to a group makes it possible with a single task or switching command via the website, Telnet or SNMP to switch several outputs (also different components) in the same manner. This avoids the need to create a separate appropriate task for each of these outputs.

If you have assigned several outputs the same group number, the selection of **one** of these outputs also switches all other outputs of this group correspondingly.

1.4.3 "Shutdown Server" action

If the "Shutdown Server" action is selected, servers on which an appropriate licence of the RCCMD software is installed can be shutdown orderly (see section 8.5.8 "Server Shutdown Configuration" in the assembly and operating instructions).

After clicking the **Setup** button, the "Shutdown Server" dialogue appears.

- Activate in the "Use" column the servers to be shut-down when the expression specified previously in the **Trigger Expression** group frame has the value "true".

1.5 Example for creating a task

You want to define a task that sends a status e-mail when the enclosure internal temperature exceeds the alarm threshold at the weekend.

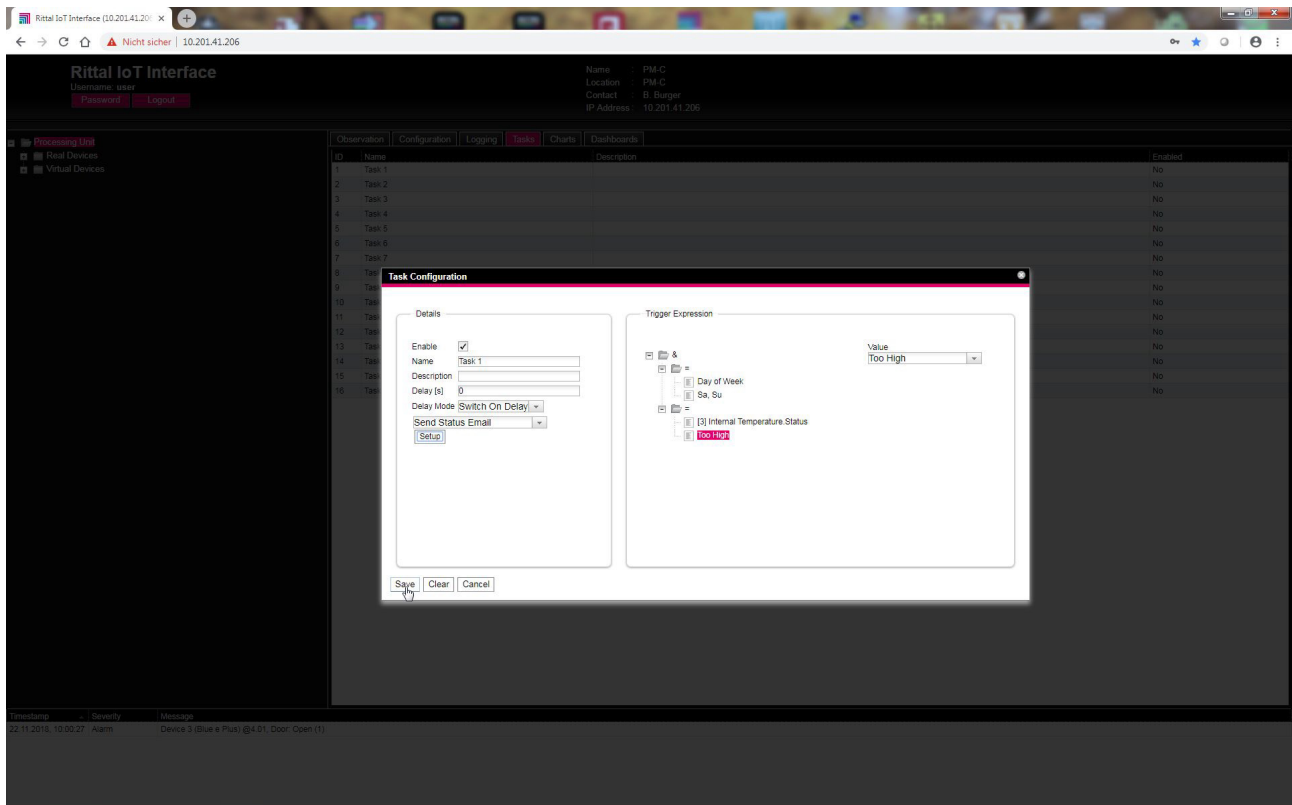


Fig. 6: "Creating a task" video

1.6 Deactivating or deleting a task

Tasks that are not required can be deactivated or deleted.

- Open the configuration menu of the associated task.

1.6.1 Deactivating a task

- Deactivate the "Enable" checkbox.
- Click the **Save** button to save the configuration.

1.6.2 Deleting a task

- Click the **Clear** button.
This causes the task settings to be reset to their default values.
- Click the **Save** button to save the configuration.

2 Virtual Devices

2.1 General

The so-called "Virtual Devices" are displayed below the "Real Devices" in the left-hand area of the screen, i.e. the devices actually connected to the IoT interface. They must first have been created on the right-hand side by clicking the **Configuration** tab.

Sensors and output devices can be coupled to form a new, predefined type of "virtual device". For example, when a specified temperature measured with a temperature sensor connected or the Blue e+ cooling unit is overshoot, a fan connected to a Power Unit (DK 7030.050) will be switched on.

A virtual device is treated as a dedicated component, for which, for example, the status can also be queried via SNMP. Although such a status query is not possible for a task, tasks can be configured to a greater extent.

2.2 Types of virtual devices

You can select the following types as virtual device:

- Two-Level Controller
- Access Controller
- Blue e+ Remote Controller
- Filter Fan Controller

2.2.1 Two-Level Controller

Such a controller can be used to switch an output on or off (e.g. an output of a connected IO unit) using a specified (threshold) value (e.g. a limit temperature). The above-mentioned (threshold) value is specified directly in the virtual device and is independent of the limit values defined in the actual sensor.

In contrast to a task, a two-level controller cannot evaluate the status of the assigned sensor. This is possible only with a task (see section 1 "Tasks") for which combinations of status and time conditions can be set and one or more actions performed.

2.2.2 Access Controller

An access controller can be used to switch a switchable output using a reader (transponder reader or number-combination lock). This allows, for example, a room access door to be monitored and opened.

2.2.3 Blue e+ Remote Controller

The remote controller allows a Blue e+ cooling unit to be passed different values as input factors. The input factors can be sent to the Blue e+ cooling unit either via sensors also connected to the IoT interface or via an external controller (PLC).



Note:

Only **one** remote controller may be created for each cooling unit. Otherwise, conflicts can occur in the closed-loop control and so cause undefined states.

2.2.4 Filter Fan Controller

This controller makes it possible to link as input variable a connected fan-and-filter unit with a temperature sensor. The fan-and-filter unit is then regulated based on this input variable.



Note:

Only **one** Filter Fan Controller may be created, otherwise conflicts can occur when regulating the connected fan-and-filter units and so undefined states result.

2.3 Creating a virtual device

You create a virtual device on the **Configuration** tab. To do this:

- Select the "Virtual Devices" entry in the navigation area of the screen.
- Click the **Configuration** tab in the right-hand area of the screen.
- Click the **New** button in the **List of Virtual Devices** group frame.
- Select the desired type of the virtual device in the "Virtual Device Type" dropdown list in the "Create new Virtual Device" dialogue (e.g. "Two-Level Controller").
- Click the **OK** button to confirm the selection.

The configuration change causes the list of all devices to be reloaded automatically. A new component, e.g. the above-mentioned "Two-Level Controller", marked with a small green "+" character appears in the navigation area under the "Virtual Devices". The multi-LED of the IoT interface flashes cyclically green – orange – red.

- Confirm the message for the configuration change (see section 6.4 "Acknowledgement of messages" in the assembly and operating instructions).

The device list is reloaded automatically. The entry under the "Virtual Devices" now has a yellow background and the LED of the IoT interface illuminates orange continuously provided no other alarm is pending.

- Then specify the input and output of the virtual device. Depending on the virtual device type, the output of the virtual device can only be specified (see section 2.4 "Inputs and Outputs").

The device list is then reloaded automatically. A blue "information" symbol is displayed in the entry under the "Virtual Devices" and the LED of the IoT interface illuminates green continuously provided no other alarm is pending.

- Then configure all settings on the **Observation** tab (see section 2.5 "Configuring a virtual device").

2.4 Inputs and Outputs

If a "Virtual Device" is selected in the navigation area, an additional "Configure Inputs and Outputs" icon appears on the **Configuration** tab. In addition to the configuration of the access rights and the behaviour on occur-

rence of an alarm, the inputs and outputs must also be configured for a virtual device.

- Select the desired "Virtual Device" in the navigation area.
- Click the **Configuration** tab in the right-hand area of the screen.
- Click the "Configure Inputs and Outputs" icon.
- Alternatively, click the **Edit** button in the list of all virtual devices.

The "Input/Output Configuration" dialogue appears.

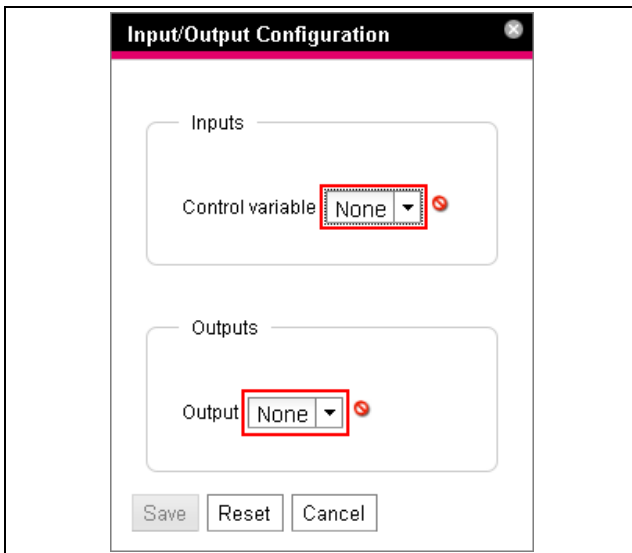


Fig. 7: "Input/Output Configuration" dialogue

For a virtual device of the type "Two-level controller":

- Select the desired variable in the "Control Variable" dropdown list, e.g. "Blue e Plus.Internal Temperature.Value" for the currently measured temperature value of the air drawn from the enclosure into the cooling unit.

Parameter	Explanation
Control Variable	Variable whose value should be monitored.

Tab. 7: **Inputs** group frame

The **Inputs** group frame does not exist for a virtual device of the "Access Controller" type.

- Select in the "Output" dropdown list the output that for a specified change of the variable value defined above should be switched.

Parameter	Explanation
Output	Output to be switched.

Tab. 8: **Outputs** group frame

The **Outputs** group frame is not available for a virtual device of the "Filter Fan Controller" type.

- Select the desired variable for the associated fan-and-filter unit in the corresponding dropdown list, e.g. "IoT Interface.Temperature.Value".

Parameter	Explanation
Area1 FanX -> Sensor	Variable (temperature value) to be used for the Filter Fan Controller.

Tab. 9: **Interface 1** group frame



Note:

Because fan-and-filter units themselves do not have a temperature sensor which produces a measured value they can regulate, a separate temperature sensor as the measuring point (input) should be selected for regulating here.

The device list is then reloaded automatically and you can further configure the virtual device.

2 Virtual Devices

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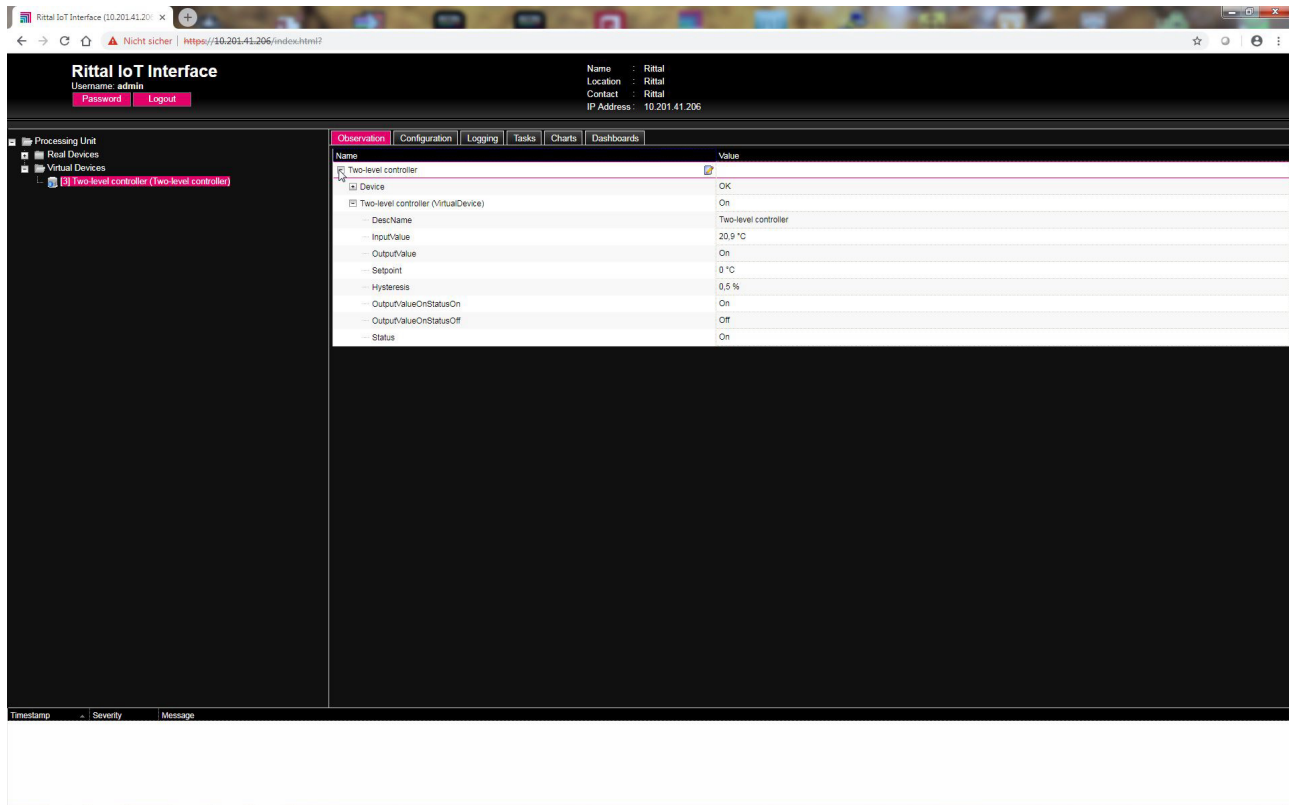


Fig. 8: "Creating a virtual device" video

2.5 Configuring a virtual device

■ Select the appropriate "Virtual Devices" in the navigation area of the screen.

■ Click the **Observation** tab to perform the settings.

On the "Device" level, general settings for the virtual device are performed or parameters displayed that provide detailed information about the virtual device (see section 8.3.1 "Device" in the assembly and operating instructions). The "Production Date" parameter shows the calendar week in which the Virtual Device was created in the IoT interface. This requires that the system time in the IoT interface was set correctly.

Depending on the virtual device type, various parameters are displayed on the "Virtual Device" level.

2.5.1 Two-Level Controller

Parameter	Explanation
DescName	Individual description of the virtual device.
InputValue	Current value of the virtual-device input.
OutputValue	Current value of the output taking account of the settings for "OutputValueOnStatusOn" or "OutputValueOnStatusOff".
Setpoint	Switching point of the input for a status change of the output.

Tab. 10: "VirtualDevice" level for a two-level controller

Parameter	Explanation
Hysteresis	Required percentage deviation for under-shooting or overshooting the switching point for a status change (see section 16 "Glossary" in the assembly and operating instructions).
OutputValueOnStatusOn	Value of the output when the input value lies above the switching point ("On" status).
OutputValueOnStatusOff	Value of the output when the input value lies below the switching point ("Off" status).
Status	Current status of the two-level controller. Status "On": Input value lies above the switching point. Status "Off": Input value lies below the switching point.

Tab. 10: "VirtualDevice" level for a two-level controller

2.5.2 Access Controller

Parameter	Explanation
DescName	Individual description of the virtual device.
Command	The selection of the "Switch" command switches the output of the virtual device. It then switches for the duration stored in the "Delay" field the status stored in the "AccessLogic" field.

Tab. 11: "VirtualDevice" level for an access controller

Parameter	Explanation
OutputValue	The current value of the switchable output that has been assigned to the access controller ("On" or "Off").
Delay	Duration for which the output of the virtual device changes its status. After expiration of this time, the output switches back to its original status. This parameter acts only when the "Toggle Output" entry is not selected in the "AccessLogic" dropdown list.
Access Logic	Status to which the output of the virtual device switches for permitted access. "Delayed On": Activate the output. "Delayed Off": Deactivate the output. "Toggle Output": Switch the output to the other status (from "On" to "Off" and vice versa).
Status	Current status of the access controller.

Tab. 11: "VirtualDevice" level for an access controller

Ensure that the configuration of an access controller has the following sequence:

- Select the status in the "AccessLogic" dropdown list into which the access controller should switch, e.g. "Delayed Off".
- Create with the "Delay" parameter the duration with which the output is switched into the previously selected status.
- Activate the "Switch" entry in the "Value" dropdown list.
The access controller switches for the entered duration into the previously selected status, e.g. "Off", and then into the other status, e.g. "On".
- Specify in the access configuration with which access codes or which transponder cards the access controller can be activated (see section 8.7.3 "Access Configuration" in the assembly and operating instructions).

2.5.3 Blue e+ Remote Controller Connected Device

Parameter	Explanation
Serial Number	Serial number of the connected device.
Type	Type of the connected device. Only the Blue e+ cooling unit is currently supported.
Interface	The designation of the interface to which the device is connected (Modbus 1 or Modbus 2).

Tab. 12: "Connected Device" level

Standby and Door

The "Standby" and "Door" functions both place the connected cooling unit into standby mode. The "Door" func-

tion also issues the "Door open" message on the cooling unit display.

Parameter	Explanation
DescName	The individual description of the associated "Standby" or "Door" function.
OnState	The status for which the cooling unit is placed in the "Standby" or "Door" mode. The status that can be selected here depends on the input linked with this function.
TimeOut	The time until the external closed-loop control is deactivated.
Value	The current value of the remote controller. Value "0": remote controller is inactive. Value "1": remote controller is active.
Status	The current status depending on the selected closed-loop control variant of the remote controller.

Tab. 13: "Door" or "Standby" level

When creating the link, the current status of a sensor is used as "OnState". The value of the "OnState" parameter can be selected subsequently from the states available for selection.



Note:

Because the current status of the sensor is used as "OnState", the connected cooling unit **always** switches initially to standby mode when the link is created.

Temperature and Dewpoint



Note:

To allow the closed-loop control to be made in accordance with an external temperature sensor, "external sensor" closed-loop mode must be selected in the cooling unit. The displayed temperature value then also appears at the "External Temperature" level for the cooling unit (see section 10.6 "External Temperature" in the assembly and operating instructions).

Parameter	Explanation
DescName	The individual description of the associated "Temperature" or "Dewpoint" function.
TimeOut	The time until the external closed-loop control is deactivated.
Value	The current value of the linked temperature or dewpoint.

Tab. 14: "Temperature" or "Dewpoint" level

Parameter	Explanation
Status	The current status depending on the selected closed-loop control variant of the remote controller.

Tab. 14: "Temperature" or "Dewpoint" level

If two Blue e+ cooling units are connected to an IoT interface, these two devices can be controlled in accordance with the temperature value of a connected CMC III temperature sensor.

To use the "Dewpoint" function, a humidity sensor (7030.111) must be connected to the IoT interface. The current dewpoint is determined from the "Temperature" and "Humidity" measured values used as input for this function. If the dewpoint temperature exceeds the expected evaporation temperature, the integrated condensate evaporation is deactivated to save energy.

The Blue e+ cooling unit can be controlled via an external controller (PLC). In this case, for example, an appropriate value can be transferred via SNMP, OPC UA or ModBus/TCP from the PLC to the IoT interface in order to place the Blue e+ cooling unit into standby. In such a case, observe the following comments for the variables.

- The "TimeOut" and "Value" variables are read-only.
- Although the value of the "TimeOut" variable is set automatically by the remote controller, it cannot be viewed in the web user interface for operating the device or via SNMP. The value is copied directly to the Blue e+ cooling unit.
- The external closed-loop control is active immediately once the sensor is connected with the IoT interface and has been configured appropriately.

For the "Status" variable, the following values are possible for closed-loop control via connected sensors:

- N/A: Initialisation of the remote controller.
- On: The remote controller sends data.
- Off: The remote controller does not send any data.
- Changed: The remote controller does not receive any valid input value (e.g. the sensor is disconnected).



Note:

- The "Standby" and "Door" items are active only when the configured "OnState" status has the value "true".
- The "Temperature" and "Dewpoint" items are active immediately.

Closed-loop control via external controller

The Blue e+ cooling unit can be controlled externally via an external controller. In this case, for example, the values of external sensors are acquired by the software and transferred via SNMP to the IoT interface in the appropriate fields. In such a case, observe the following comments for the variables.

– The "TimeOut" and "Value" variables must be filled with values by the external controller.

- The value of the "TimeOut" variable must be set again cyclically by the external controller before it is decremented to the value "0".
- The value of the "Value" variable must also be set by the external controller.
- The external closed-loop control is active while the value of the "TimeOut" variable is larger than "0".
- If the "TimeOut" variable has the value "0" for a stored time, the cooling unit switches automatically to autonomous closed-loop control. This ensures a cooling function even for failure of the external control.

For the "Status" variable, the following values are possible for closed-loop control via connected sensors:

- N/A: Initialisation of the remote controller.
- Remote: The value of the "TimeOut" variable is larger than "0".
- Off: The value of the "TimeOut" variable is "0".



Note:

The external closed-loop control via an external controller is automatically active when no connected sensor was selected for the appropriate input.

Linking devices

To create a virtual device of the "Blue e+ remote controller" type, proceed as follows:

- Select the "Blue e+ remote controller" entry in the list of virtual devices.

The "Input/Output Configuration" dialogue opens.

- Select either a connected sensor or the "None" input in the "Inputs" area for the desired "Standby", "Door", "Temperature" and "Dewpoint" inputs.

The states of all available variables can be selected for the "Standby" and "Door" inputs; the values of all available variables can be selected for the "Temperature" and "Dewpoint" inputs.

For the selection of a sensor (or status value of a sensor), the closed-loop control is activated automatically via this sensor so that an external software cannot fill the "TimeOut" and "Value" variables for this input.

- Select in the "Devices" area the cooling unit that should be controlled via the external closed-loop control.

Example: Create a Blue e+ controller and the switching to standby when the internal temperature falls below 20 °C.

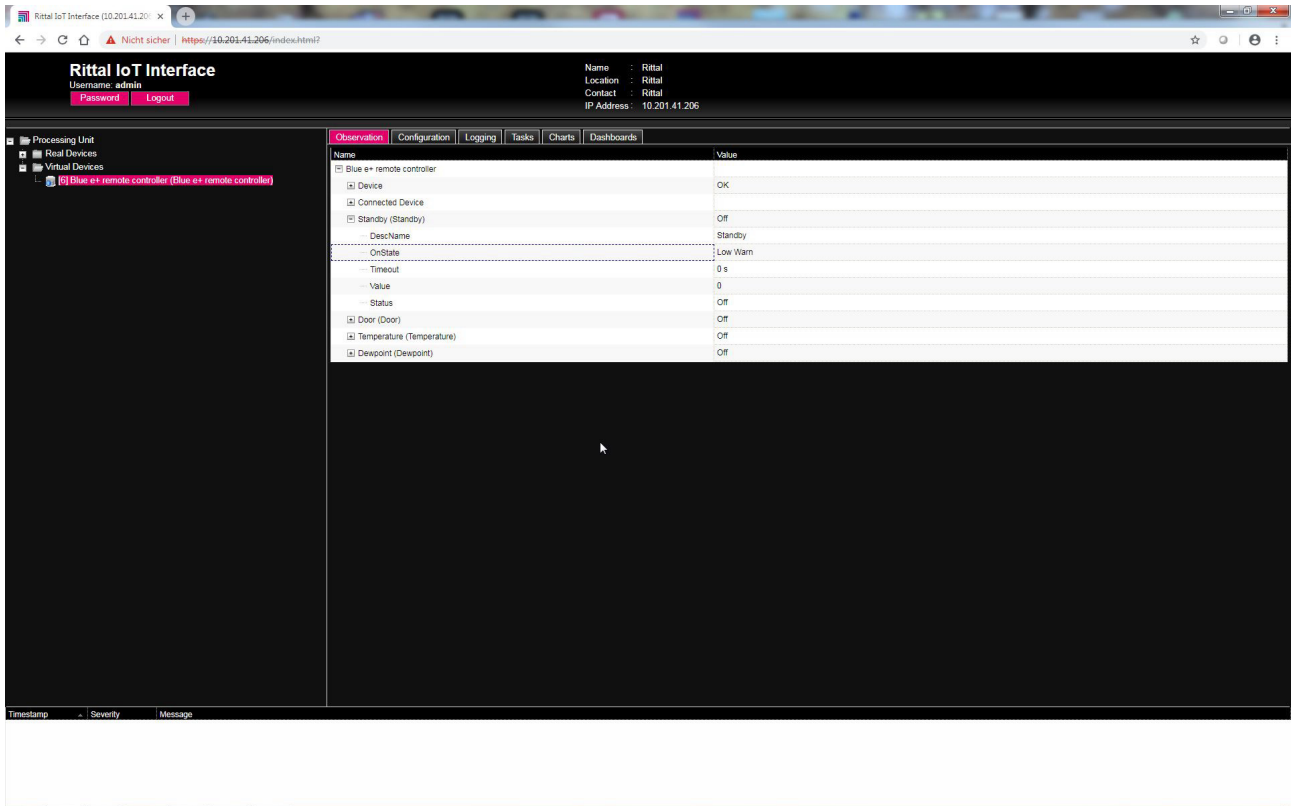


Fig. 9: "Connecting a Blue e+ controller" video

2.5.4 Filter Fan Controller

Parameter	Explanation
DescName	Individual description of the combination of filter fan and temperature sensor.
Value	Currently measured temperature value of the linked sensor.
Status	Current status of the Filter Fan Controller.

Tab. 15: "FanX_Sensor" level

- Confirm this by clicking the **OK** button or terminate the action by clicking the **Cancel** tab.
- Then confirm the message for the configuration change (see section 6.4 "Acknowledgement of messages" in the assembly and operating instructions).

2.6 Deleting a virtual device

A virtual device is deleted on the **Configuration** tab. To do this:

- Select the "Virtual Devices" entry in the navigation area of the screen.
- Click the **Configuration** tab in the right-hand area of the screen.
- Select in the **List of Virtual Devices** group frame the virtual device to be deleted.
- Select with pressed "Ctrl" key other virtual devices that you also want to delete.
- Click the **Delete** button.
A prompt appears as to whether the virtual device should actually be deleted.

Notes

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[illegible]

This image shows a full page of blank graph paper. The grid consists of thin, light gray horizontal and vertical lines that intersect to form small squares across the entire surface. There are no margins, text, or other markings on the paper.

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